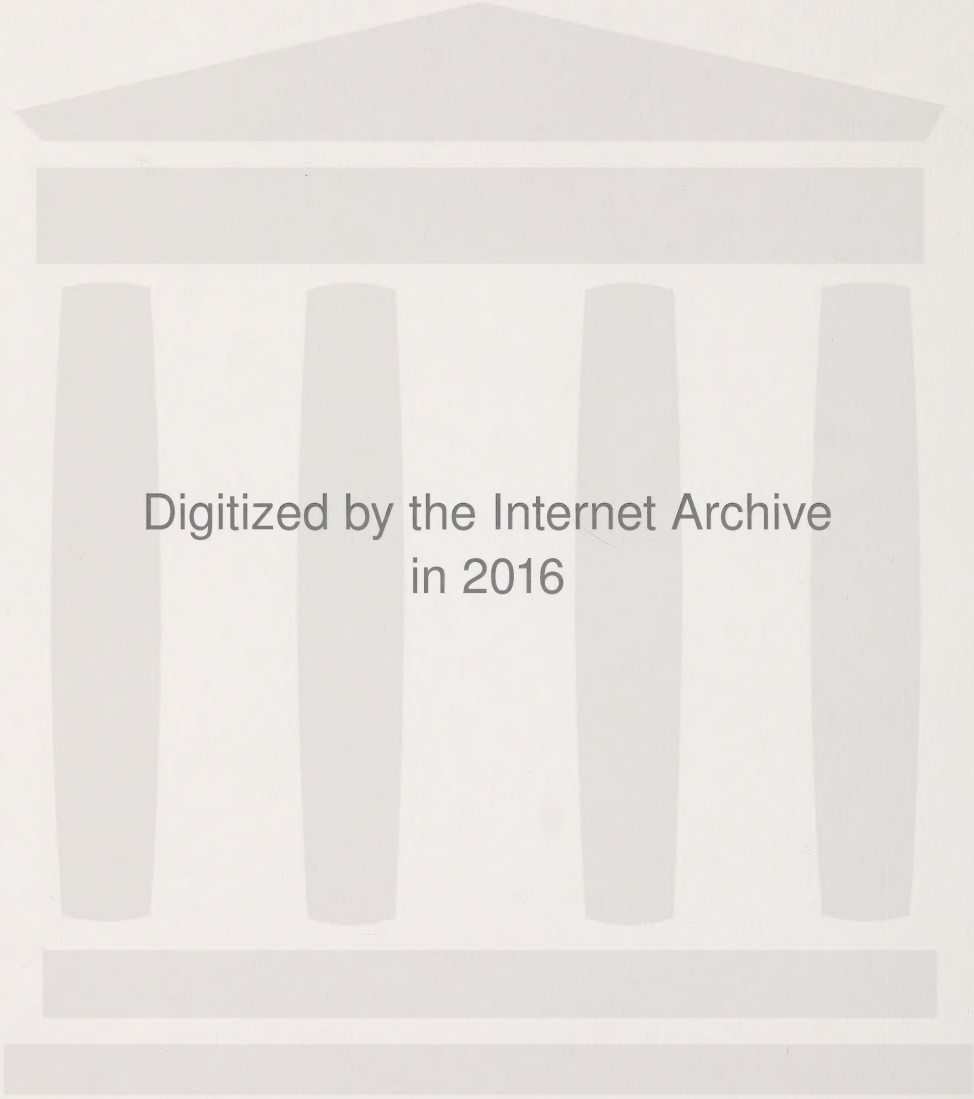
ERCB D 84-1

ERCB

Requirements for Major Electric Transmission Lines In the Edmonton Area

Inquiry

February 1984



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ENERGY RESOURCES CONSERVATION BOARD

Calgary Alberta

BOARD INQUIRY INTO REQUIREMENTS FOR MAJOR ELECTRIC TRANSMISSION LINES IN THE EDMONTON AREA

Inquiry D 84-1
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EXECUTIVE SUMMARY

This inquiry was called to identify future major transmission lines needed to supply electric energy requirements in the Edmonton area, as well as to consider how those requirements might best be met having regard for the many physical constraints in the area.

Electric utilities, municipal planning bodies, the cities of Edmonton and St. Albert, Alberta Government Telephones, and Transport Canada participated in the inquiry.

There was a general concensus that

1. Long-term growth will require major (probably 500-kV) transmission lines from the Ellerslie substation to the south, and possibly to the east.
2. Long-term power plant developments may result in the need for major transmission facilities in the northwest, either south of Big Lake or east of St. Albert, but this requirement is less definite than that in the southeast.
3. The southern requirement traverses an area that is subject to active development (urban and industrial) and already has substantial constraints as indicated on the map attached. The number of constraints will increase with time and unless steps are taken now to plan for the transmission lines there are likely to be serious problems when that need finally develops.

Several planning alternatives were suggested. While the establishment of either a special or a multi-use corridor would provide a suitable solution, there was no indication that such a corridor was being seriously contemplated and the Board does not believe that it is a realistic possibility under current or foreseen circumstances. The Board believes that the most practical alternative would be to incorporate the right of way within the transportation plan that is expected to evolve for the area. It intends to have discussions with Alberta Transportation and others to explore this possibility.

CONCLUSIONS

To Utilities and Planners:

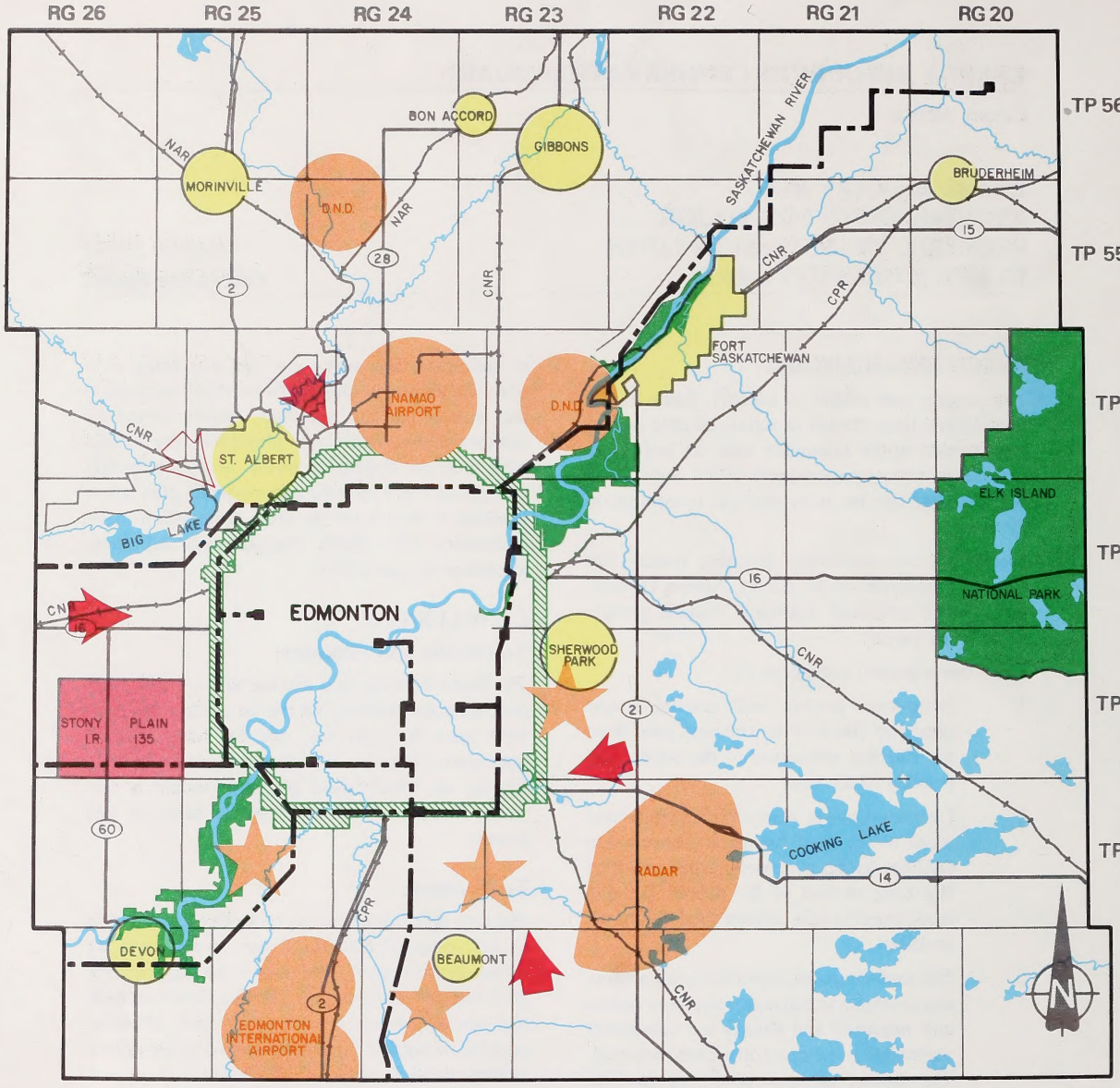
The Board believes that electric utilities and planning agencies should continue to discuss development plans for land use, and for future electric transmission lines around Edmonton, with a view to firming up transmission planning within a few years. Board staff are available to assist in this process.

To Planners:

Planning agencies appear to be in the best position to alert potential land developers to the need for future electric transmission lines in the geographical areas outlined in this report. The Board recommends that potential developers be alerted and, wherever possible, a suitable warning be added to area plans as they are developed and documented.

To Transportation Planners:

Should multi-purpose corridors be established in the northwest or southeast for other reasons and uses, particularly development of the transportation system, provision should be made for inclusion of transmission lines similar to the provisions for rights of way within the existing RDA.



LEGEND

- EXISTING 240kV AND 500kV TRANSMISSION LINES
- EXISTING SUBSTATION SITES
- TRANSPORTATION & UTILITY CORRIDOR
- RESTRICTED DEVELOPMENT AREA AND NATIONAL PARK
- MAJOR CONSTRAINT AREAS
- RADIO STATION CONSTRAINT
- POTENTIAL CORRIDOR

SOURCE EUPC (FEBRUARY 1983)

EDMONTON AREA
MAJOR TRANSMISSION LINE CONSTRAINTS

ENERGY RESOURCES CONSERVATION BOARD

Calgary Alberta

BOARD INQUIRY INTO REQUIREMENTS FOR MAJOR ELECTRIC TRANSMISSION LINES IN THE EDMONTON AREA

Inquiry D 84-1
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1 INTRODUCTION

1.1 Background

At a public hearing held in Edmonton during December of 1980 to consider an application for 500-kV transmission lines from Keephills to Ellerslie, several interveners urged the Energy Resources Conservation Board to play a more active role in the planning area. Therefore, in its Decision Report 81-D respecting these 500-kV lines, the Board said it would consider convening a public inquiry to consider the long-term transmission line requirements for the Edmonton area. This was also in response to the Alberta Government's transmission line policy, which called for consideration of Alberta's long-term transmission line requirements with the objective of permitting and encouraging long-range planning and participation by all interested parties.

1.2 The Inquiry

The Board held a public pre-inquiry meeting on 19 November 1982 in Edmonton to hear comments and views regarding the inquiry. After considering these submissions, the Board issued a Memorandum of Decision outlining the procedures to be used and the scope of the inquiry.

The inquiry was held in Edmonton on the 5th and 6th of July 1983 with V. Millard, V. E. Bohme, P.Eng., and C. J. Goodman, P.Eng., sitting. Those whose appeared at the inquiry are identified in Appendix I.

Before the filing of final submissions, staff of the Board's Hydro and Electric Department held an informal workshop meeting on 2 June 1983 at the Chateau Lacombe in Edmonton with those parties who filed initial submissions. The purpose of the workshop was to provide an opportunity for the inquiry participants to better understand the submissions. Each party briefly summarized its submission, areas where additional material was warranted were identified, and an informal discussion clarified the submissions.

2 SCOPE OF INQUIRY

The Memorandum of Decision from the pre-inquiry meeting established that the scope of the inquiry would include consideration of:

(a) the Edmonton area forecast electric load as part of the overall Alberta forecast;

(b) the major electric transmission lines and substations expected to be required to meet the future area load, and the sensitivity of the timing of such facilities to the forecast load;

(c) the identification of routing constraints, existing and planned developments (regional and municipal), highways, pipelines, corridors, and airports, etc;

(d) the criteria to be applied in evaluating and selecting transmission line routes and substation locations; and

(e) the requirements and alignments for future corridors.

3 VIEWS OF PARTICIPANTS

3.1 Electric Load Forecast

The Electric Utility Planning Council's (EUPC) report outlining planned and potential needs for transmission lines was based on its 1982 Energy and Demand Forecast. The EUPC stated that the forecast could vary by as much as 20 per cent by 1997 and not have any significant effect on transmission planning. It expected lower growth than that depicted in its 1982 forecast but said this would result in project deferment of four to five years and was not significant enough to change long-term transmission planning as most of the long-range transmission projects are primarily related to generation development.

All participants accepted the EUPC growth projections for the purposes of their submissions to the inquiry. The Edmonton Metropolitan Regional Planning Commission (EMRPC) noted that the EUPC

forecast should be viewed as very long term, that variation in load requirements and timing of specific projects could be expected, and that potential transmission developments are far into the future, especially if the EUPC load forecast proves high.[1]

3.2 Facilities

The EUPC submitted a detailed plan for major substations and line additions with modifications in the short and long term under three possible generation development scenarios. It concluded that, for purposes of supplying load within the Edmonton area, the existing 240-kV ring (Figure 1) with the addition of some new circuits into the east and northeast of the city and the addition of some 240-kV distribution substations would be sufficient in the period studied. It noted that there will be a requirement for an additional 240-kV transmission line into the downtown area to meet the growing load.

The EUPC stated that the need for future access to the Edmonton area transmission hub will be primarily a result of the development of new generating sites. Development of transmission around the Edmonton area is much more sensitive to the timing and magnitude of new generation in Alberta than to load growth in the Edmonton area.

The City of Edmonton noted that the EUPC evaluation was consistent with Edmonton Power's long-range conceptual electrical plan and that the only major transmission additions required within the city boundary in the next 20 years are the TransAlta Utilities Corporation (TransAlta) 240-kV circuits from Ellerslie to the Fort Saskatchewan area, on the east side of the city, and the 240-kV supply from the west end to a new downtown station. The City of Edmonton stated that the inner city 72-kV supply system cannot be economically expanded and most new substations will connect to the city's 240-kV ring.

As long-term requirements indicated very little transmission line development within the city, interest centred on corridors and long-range land-use planning issues involved in transferring electric energy to, and around, the Edmonton area from remote generating stations.

[1] Since the inquiry, the EUPC has published its 1983 forecast which confirms expectations that the load will be significantly less than predicted in the 1982 forecast, and that potential transmission developments will likely be deferred.

3.3 Constraints

The EUPC stated that the Edmonton area is already severely constrained so work should proceed promptly in delineating corridors. In order to identify potential transmission corridors, the EUPC evaluated the general location and approximate area of major constraints to future transmission line developments. These contraints together with the EUPC's potential transmission corridor alignments are depicted in its map entitled Edmonton Area Major Transmission Line Constraints (Figure 2). This map identifies some of the most obvious constraints that cause concern in the northwest and southeast areas where 240- and 500-kV corridors would increase with time. The EUPC stated that failure to consider the potential development of future transmission lines in these areas would make it very difficult and expensive to gain public acceptance and construct facilities when needed. It recommended that a mechanism be developed to ensure that land-use planning for the Edmonton area includes provision for rights of way for future transmission line requirements and, particularly in the northwest and southeast, should recognize and reserve access for future transmission lines to ensure that the optimum facilities will be possible with minimum impact on land use or the public.

The EMRPC used its list of land-use planning principles to access several key constraints to transmission line development and several other constraints which allowed some flexibility, through the use of appropriate mitigative techniques, in delineating potential penetrator corridors. The EMRPC assessed existing and proposed land-use areas, infrastructure locations, environmentally sensitive areas, and other linear developments. EMRPC constraint factors and potential corridor locations are shown on its map entitled E.M.R.P.C. Constraint Factors (Figure 3).

The EMRPC proposed the following as major constraints to corridor development:

- existing residential areas;
- close proximity to farm houses, rural residences, and places of business;
- existing and planned transportation and communication systems that could be compromised;
- routes other than along section lines, quarter section lines, or property lines to minimize interference with agricultural practices;
- areas with adopted area structure plans;
- future urban expansion areas that might be fragmented;

- facilities such as defense installations, fixed commercial communication systems, and established air space and navigation aids; and
- resource-extraction projects.

From a regional land-use perspective, several recurring areas of concern were identified by the EMRPC:

- existing concentrations of residential and industrial nodes offer varying degrees of compatibility with linear developments - country residential nodes and heavy industrial nodes in the County of Strathcona should be avoided;
- south and east of Big Lake, recognized sensitive land-use areas should be avoided; and
- all of the potential corridors indentified by the EUPC and EMRPC impact in varying degrees on the various communication interference zones and airport control facilities identified around the Edmonton area.

The EMRPC concluded:

- that the development of any linear facility required in or near the Edmonton area is already constrained by urban development and other land-use commitments;
- there is a real concern that failure to secure suitable corridor locations at this time will limit the choices available in future, and that land-use impacts and environmental and socio-economic considerations will be harder to address in the future;
- there is a need for penetrator corridors in the Edmonton area; and
- the continued proliferation of single-facility rights of way increases land fragmentation, intrusion in urban areas, and potential conflict with adjoining land uses.

The City of Edmonton stated that a decision with regard to the identification of penetrator routes into the city must be made in the near future as transmission line options will be progressively reduced. The City of Edmonton noted that it was imperative that the most suitable penetrator routes be identified and specific implementation mechanisms be formulated and exercised at the earliest possible time.

The City of Edmonton noted that from a land-use planning perspective and in respect of the EUPC potential transmission corridors:

- there do not presently appear to be major constraints resulting from proposed or committed land uses in the southeastern section of the city;
- the corridor tentatively proposed for the areas east of Beaumont might be best accommodated by a southerly extension of the existing Sherwood Park Restricted Development Area (RDA) and this would not impact land uses in the city;
- the potential alignment approaching the city directly from the west may encounter constraints in the Lewis Farms and Winterburn areas; and
- land-use planning constraints do not appear to be significant at this time in the general locations of the remaining two potential penetrator corridors in the northwestern sector.

The City of St. Albert's observations regarding EUPC potential corridors were:

- the potential corridor located immediately east of Big Lake would place serious constraints on the planned development of major industrial, recreational, and environmental land uses within the city and would be opposed by St. Albert;
- the potential corridor south of Big Lake, parallel to Highway 16, is supported by St. Albert; and
- the potential corridor to the east of St. Albert creates possible constraints to the development of future industrial lands but does not restrict St. Albert land-use development as significantly as that located immediately east of Big Lake.

TransAlta noted that there are some problems with co-ordination among various uses in a multi-use corridor and suggested that, while multi-use corridors have some advantages, single-use corridors should also be considered.

Stewart, Weir & Co. stated that the opportunity now exists to co-ordinate land-use planning and linear facility development to reflect the legitimate access requirements of industry while recognizing the options to eliminate or reduce the external effects of such facilities on urban land uses. Building upon the information submitted by the EUPC, this participant addressed the use of multi-use corridors as an appropriate planning mechanism in the Edmonton area. In this context, constraints outlined by Stewart, Weir & Co. were:

Land-Use Constraints

- where possible, corridor alignments should follow existing rights of way;
- where possible, corridor alignments should be in industrial areas, or areas of land-use or planning-unit interface;

- alignments should lie adjacent to quarter sections and parcel or field boundaries;
- alignments should not bisect existing or committed planning units;
- corridors for hazardous product pipelines should not bisect or lie directly adjacent to residential, institutional, or other population concentrations;
- alignments should avoid existing and proposed parks;
- alignments should avoid proximity to rural farmsteads or country residential areas; and
- corridor alignments should avoid federal lands and Indian reserves.

Environmental Constraints

- alignments must allow for topography and landscape features;
- the number of water or drainage-course crossings must be minimal and those chosen should reflect a balance of the optimal geophysical site and the minimal environmental impact;
- alignments should avoid areas of critical aquatic and terrestrial habitat;
- alignments should avoid significant historical or cultural resources and ecological or natural areas;
- alignments should avoid unstable slopes and organic soils;
- alignments should preserve windrows and protective vegetation in agricultural areas; and
- alignments should avoid mineral resource extraction areas.

Technical Constraints

- corridors for electric transmission lines should not interfere with communication, radio, railroad, and air-traffic control communication systems, preferably by avoiding these facilities or, where not avoidable, by the use of mitigative devices;
- corridor alignments should minimize the crossing of existing linear facilities;
- corridor alignments will tend to follow the least flexible component but should recognize the requirements of the more flexible components;
- the extra cost of using corridors could be reduced by corridor alignments being located where right of way needs have been identified and by shortened route lengths and reduced deflections; and
- corridor alignments should not significantly reduce the reliability of the component facilities.

Transport Canada's submission outlined areas of concern relating to the proximity of transmission lines and substations to its non-directional beacons, instrument landing systems, radar, and runways. It confirmed that the safe distances specified in its submission were not absolutes but identified areas where Transport Canada would like to be advised of planned electrical facilities. A detailed evaluation on a case by case basis would permit Transport Canada to give a precise set-back distance from airport facilities and to discuss mitigative measures as warranted.

Alberta Government Telephones (AGT) stated that it would like to participate in the process of establishing transmission line routes to minimize possible interference with AGT communication facilities.

3.4 Criteria

All the participants recognized that the selection process for transmission line routes and substation locations must be based upon a wide range of technical, environmental, and land-use concerns. The EMRPC recommended, as general land-use planning principles, that proponents of transmission line rights of way and multi-use corridors consider the following issues:

Land-Use Issues

- Route lines so as to locate them in or be parallel to established utility or energy corridors.
- Maximize the opportunities to locate in multi-use corridors.
- Avoid the fragmentation of future urban expansion areas.
- Provide mechanisms for public input during the corridor/route selection process.
- Avoid penetrating existing developed areas.
- Avoid diagonal routes because of increased land-use impacts.
- Minimize the physical and visual impact on people.
- Route transmission lines/corridors through industrial areas rather than residential areas.
- Route lines adjacent to areas planned for land-use changes rather than divide planning areas (eg residential to industrial).
- Avoid approved and anticipated Area Structure Plan areas.

Rural Issues

- Minimize effects on prime farmland.
- Route along section lines, quarter section lines, or property lines to minimize interference with agricultural practices.
- Route on range or uncultivated land rather than cropland to minimize economic and other impacts on agricultural practices.
- Avoid close proximity to farmhouses, country residential development, and places of business.

Environmental Issues

- Avoid designated or registered recreational, historic, archeological, or other culturally significant areas.
- Minimize disturbance of shelterbelts, woodlands, and wooded areas.
- Avoid disturbance of unique or rare species of plants and animals.
- Avoid interference with designated or registered areas of conservation or ecological importance.
- Minimize interference with existing surface water drainage patterns.
- Avoid physical features that result in excessive span lengths.
- Avoid areas of unstable soil.
- Select alignments that respect the topography and the aesthetics of the landscape.

Technical Issues

- Avoid interference with facilities such as defence and commercial navigational installations and fixed commercial communication systems.
- Avoid interference with established airspace.
- Avoid interference with public facilities such as reservoirs and municipal water sources.
- Minimize interference with extraction of mineral resources.
- Minimize total line length to reduce overall impact and cost.
- Maximize use of existing rights of way.
- Ensure the reliability and security of the Alberta electric system and the compatibility of short-term projects with long-range provincial plans.

The City of Edmonton concurred with the EMRPC's assessment criteria, recognizing that the overall ranking of the relative significance of each factor is site specific. Edmonton Power stated that its most important consideration is economics and that in many cases it is a trade-off between cost and satisfying land-use and environmental concerns.

Stewart, Weir & Co. also agreed with the EMRPC's criteria, however, it stressed that the multi-use corridor concept should be first and foremost in situations involving multiple linear rights of way in areas with severe constraints to linear facilities.

TransAlta also concurred with EMRPC's criteria list provided that electrical and cost considerations received equivalent recognition.

The City of St. Albert presented some guidelines that generally concur with the EMRPC's criteria.

3.5 Alignments

The EUPC view of available corridors for new transmission lines is depicted in Figure 2. The EUPC noted that, while it appears likely that facilities would be required in these areas and that land for corridors is currently available, there is no guarantee that transmission lines will ever occupy any of the corridors. Recognizing the future electrical requirements in the Edmonton area and the existing constraints, rights of way in the form of penetrator corridors should be investigated in the northwest and southeast, but primarily the southeast Even where corridors are established, however, there should be no dictate that all transmission lines must use a particular corridor as there may be circumstances that would necessitate them being outside the corridor. The EUPC noted that while a corridor in the northwest and southeast should be considered, the northwest penetrator could be eliminated by taking power from Dunvegan, Judy Creek, and/or Slave River directly to Deerland east of Edmonton. The EUPC stated that a decision on the Slave River project will be made in the next year or so, and believed that that might be a more appropriate time to consider actual corridor alignments. A decision on the project would help to fix long-term transmission line requirements in the Edmonton area.

The EMRPC identified possible corridors where linear developments could by-pass areas of high constraint to connect to the RDA. Three of the corridors identified by the EMRPC are identical to those shown in the EUPC report. These corridors are shown on Figure 3 of this report.

The EMRPC acknowledged the northwest and southeast penetrator corridors and agreed that there might be a need to reserve land. The EMRPC suggested

that municipal planning authorities should give consideration to the routing concerns identified in the northwest and southeast Edmonton areas. The selection process employed by the EMRPC and the EUPC had identified eight potential corridor locations which provide a conceptual basis for further screening and evaluation. While it recognized EUPC concerns in the northwest and southeast areas, the EMRPC stated that the uncertainty of transmission line development together with the opportunities available for joint-facility use of penetrator corridors necessitated a comprehensive review of all corridor opportunities. The EMRPC believed that a transmission corridor need has not been clearly demonstrated at this time in the southeast or northwest and that a corridor should not be established until need is demonstrated. While it did not favour sterilizing land, the EMRPC believed that committing land for multi-use corridors may be appropriate because of the long-term requirements of various linear developments.

Stewart, Weir & Co. presented five opportunity areas suitable for multi-use corridors containing transmission lines. It suggested that these areas required further study by government, regional, and municipal authorities and the general public. Specifically, it recommended that immediate consideration be given to the evaluation and establishment of at least two penetrator corridors — in the northwest and especially in the southeast.

The City of Edmonton stated that a decision regarding corridor alignments and related parameters must be made in the near future and affirmed that the northwest and southeast are appropriate locations for penetrator corridors. The City of Edmonton stated that, if penetration were to be in the northwest, existing corridors should be used to their maximum potential, possibly through replacing existing lower-voltage lines. If penetration occurred in the southeast, the City of Edmonton believed the RDA, with a possible expansion, would be most appropriate.

TransAlta concurred with the need to evaluate northwest and southeast penetrator corridors and specifically noted that the southeast is of primary concern because the Ellerslie substation is a key component in the provincial electric system and because of the existing contraints in this area.

3.6 Implementation

While implementation mechanisms for ensuring the preservation of rights of way were not specifically included in the inquiry terms of reference, implementation was addressed by a number of participants and emerged as a key element.

The EUPC recommended that a mechanism be developed to ensure that land-use planning included provisions for the rights of way of future transmission lines. While it stressed that work should proceed promptly in delineating corridors, it believed that setting aside land for multi-use corridors is preferable to setting aside penetrators simply for transmission line use. The EUPC concluded that the on-going planning process in Alberta is working reasonably effectively at the present time and can continue to develop and improve and that plans for future transmission facilities can be initiated without legislative initiatives or other directions.

The EMRPC expressed a number of views it believed should be considered in planning and implementing penetrator corridors:

- single-facility right of way development in the Edmonton Metropolitan area should not be supported or encouraged in the ERCB application process;
- consolidation and joint-facility development for various linear facilities should be actively promoted;
- the ERCB sponsor a study on corridor implementation options and invite industry, government, and related agency participation. Options considered might include:
  - advance purchase by electric utilities of required rights of way,
  - extension of the existing RDAs to include penetrator corridors,
  - provincial legislation to create special planning areas,
  - municipal or regional options to create special planning designations and protection measures through various statutory plan provisions;
- electric utility companies through the EUPC should undertake a more detailed examination of their corridor requirements in the Edmonton area, considering the material presented and issues raised at the inquiry;
- the EUPC should consider preparing a comprehensive plan for future long-term facilities in consultation with affected municipalities;
- the potential exists for improving the level of consultation and communication between planning agencies, ERCB, and EUPC through the subdivision and municipal plan referral process; and
- planning authorities should investigate how future facility development could be better addressed in their statutory plans.

While the EMRPC did not specify implementation options, it stated that existing planning tools and mechanisms available today cannot assure that land needed for future corridors will be reserved unencumbered or will be available for that use when it is required.

Stewart, Weir & Co. undertook a detailed examination of implementation options for the EMRPC and concluded that a planning approach that co-ordinates linear and land-use development is required because access options are rapidly being reduced. Options discussed were:

- **Status quo** — right of way acquired at the permit application stage. This option does not address long-term future right of way requirements, nor does it resolve land-use planning issues.
- **Company option** — where the company identifies and acquires future access routes at its own discretion. However, without an approved permit to construct, the company cannot acquire the right of way from landowners not willing to participate voluntarily in long-term easement options. Moreover, unless the companies place their alignments adjacent to existing or proposed rights of way, land-use planning concerns would not be reduced.
- **Utility Corridor Act** — creation of a corridor authority with the mandate to establish and manage corridors. The corridor authority could be a new governmental agency, an existing government department or agency, or a formal inter-agency committee. The authority must have the power and funds to fully implement the corridor concept. This option would infringe upon the jurisdiction of existing agencies, which implies that either the new Act must have a superior standing over existing Acts and regulations, or the Act must provide a mechanism for negotiation between overlapping jurisdictions. Further, this Act should make provision for substantial public input, ideally through direct representation at the decision making level.
- **Special Planning Areas (SPA)** — the Alberta Government, via section 144 of The Planning Act, 1977 has the authority to establish an SPA. Since corridors can be viewed as single-use areas, the SPA designation may be inappropriate. In addition, both pipelines and powerlines are exempt from the Planning Act.
- **Restricted Development Areas (RDA)** — the RDA regulations are similar to those for the SPA, but explicitly state that those areas can be for the purpose of establishing corridors. The RDA regulations have superior standing over all other Acts and regulations, thus granting the administrators extensive control over the development of these areas. Furthermore, since proposed penetrators would be designed to provide access into the existing Edmonton Transportation and Utility Corridor, their designations as an RDA would allow for the uniform administration of all corridors by the Department of the Environment.
- **Highway Right of Way** — Cabinet could, through directive, require the Department of Transportation to acquire lands, for utility purposes, in excess of those needed for roads. However, this option presents a number of difficulties:
  - this option is only viable where a new road right of way is planned or an existing road is to be upgraded;
  - Department policy does not support the placement of parallelling facilities within the highway right of way;
  - the Minister of Transportation does not have the authority to create regulations that would control the development of the corridor lands by both the primary, secondary, and interim uses; and
  - the Department could face litigation challenging this option as being ultra vires.
- **Statutory Plans** — the Alberta Government would have to amend the Planning Act to explicitly allow for the designation of corridors in Regional Plans and Land Use Bylaws. A schedule of permitted uses and conditionally permitted uses could then be developed. However, three major concerns appear to exist with the use of this option:
  - as both pipelines and transmission lines are exempt from **The Planning Act, 1977,** the planning agencies' involvement in corridors may be challenged in the courts;
  - the planning legislation does not allow for the confiscation of land for quasi-public use. Not only would the Act have to be amended to allow for the designation of corridors for potential future utility use but compensation would have to be made available to the landowners affected; and
  - as the planning authorities do not have lead agency roles in the ERCB permit process, key actors, ie the ERCB, Alberta Environment, and Energy and Natural Resources, must formally agree to support the use of the corridors.

Stewart, Weir & Co. concluded that the non-corridor options present many difficulties and do not appear to support a comprehensive planning solution to the land-use issues. It stated that corridor preservation options all require modifications to existing legislation and active provincial government participation and may involve the massive expenditure of public funds. Although an approach requiring the Alberta Government to enact corridor legislation and establish a corridor authority may be the most difficult to pursue, it seems to be the most comprehensive corridor implementation and management mechanism. A second choice to the Corridor Authority would be the RDA with some legislative changes to allow proactive multi-use corridor planning.

Stewart, Weir & Co. asserted that input from the public, government agencies, and industry is required to determine if multi-use corridors are appropriate and, if so, to determine the exact number of penetrators, their appropriate widths and alignments, and the implementation procedure.

The City of Edmonton noted that while it did not have a solution to implementation of penetrator corridors it recognized the importance of early establishment of these corridors. It stated that an implementation mechanism available for use immediately following identification of penetrator routes is essential. The City of Edmonton asserted that present planning legislation could not preserve lands required for proposed electric transmission lines.

Corridor implementation options discussed by the City of Edmonton were:

- the utility companies obtaining easements from the respective surface rights owners;
- the utility companies obtaining the surface rights through the purchase of land — this action could be pursued by an individual utility purchasing its required right of way or a number of utility companies proceeding jointly as a consortium;
- provincial designation and ownership of rights of way in the form of transportation/utility corridors such as an RDA;
- provincial purchase of rights of way with sell-back provisions to the respective utility companies as transmission facilities are constructed; and
- city purchase of land required to accommodate a corridor.

TransAlta stated that it supported the EUPC view that a mechanism is necessary to ensure that land-use planning considers the need for future transmission lines. While it stated that it was uncertain how to preserve access, it preferred that the ERCB evaluate all the factors rather than having a split regulatory process as suggested in the establishment of a Corridor Authority. At the very least, TransAlta believed there was some merit in providing notification to all potential users of the need for future access routes as part of the planning process.

4 VIEWS OF THE BOARD

4.1 Electric Load Forecast and Facilities

The Board accepts that the forecast of expected load and the facilities to meet that load are essentially long-term projections and that variation of the actual load experienced from that projected may lead to variations in the installation dates of facilities of plus or minus five years or more. However, such variations do not significantly alter long-term needs. For the inquiry, the participants used the EUPC's 1982 forecast of electric load even though the EUPC itself characterized this forecast as being higher than the growth in electric load it now expected. The Board is of the view that in most cases variations in the electric load forecast would result primarily in a shifting of the installation dates of facilities without causing any substantial change in the type of facility or its eventual location.

At the time of the inquiry, a firm forecast of future electric generation requirements, location, and timing had not been developed much beyond approved power plants. Variations in the development of the generating pattern in Alberta might affect long-term transmission requirements in the Edmonton area. The Board is of the opinion that by the mid to late 1980s, the long-term generating pattern for the province might be better defined and the long-term transmission needs would also be more definite.

With these stated qualifications in mind, the Board is of the view that the most likely major additions within the city of Edmonton in the next 20 years are additional 240-kV substations near existing lines, 240-kV and 500-kV connections from the Ellerslie to the Fort Saskatchewan area, and a 240-kV supply to a new downtown substation from the west end of Edmonton. Some additional generation-related transmission is expected to develop around the south and eastern areas of Edmonton.

4.2 Constraints

The maps supplied by the participants pinpoint constraints very effectively and the Board sees no reason to comment in detail. The constraint-free

areas indicate potential routes for future transmission line corridors.

Specific areas identified as being more attractive for a corridor location are:

- in the southeast part of the city of Edmonton;
- an area east of Beaumont and directly south of the existing east part of the RDA;
- one area for a northwest penetrator near St. Albert; and
- a possible corridor south of Big Lake and parallel to Highway 16.

4.3 Criteria

The constraints referred to in section 4.2, and the discussion of constraints provided by the participants at the inquiry, lead to a number of criteria that may be applied to the location of single transmission lines or transmission line corridors. Some criteria that follow directly from the constraints obviously require that certain developments be avoided but the vast majority of the constraints lead to the type of criteria that specify that an area should be avoided if at all possible.

The Board agrees that proper planning criteria for a corridor should be developed with regard to such factors as general economic, technical, and other concerns. However, when actual facilities are planned, the constraints and requirements specific to the facility need to be balanced with any general criteria set out for a corridor planning-based evaluation.

The Board is in general agreement with the proposition of Stewart, Weir & Co. that multi-use corridors are appropriate in situations where multiple linear rights of way are definitely needed and there are severe constraints to the development and location of linear facilities. The Board notes that Edmonton Power expressed a preference for single rights of way and that TransAlta expressed the view that major facility additions should not be withheld simply because single-line facilities were proposed in a particular instance. Obviously, it is easier to locate multi-use corridors early and prior to area plans and development. Such corridors could be located using the criteria discussed earlier in the report and general planning principles, but in the present situation it may not be feasible to establish multi-use corridors now.

The Board observes that a number of criteria that fall in the "avoid wherever possible" class apply to either single-facility transmission lines or to the establishment of corridors, and include but are not limited to:

- established community, residential, and industrial land use;
- areas of electronic interference with other facilities;
- federal lands;
- prime and scenic timber areas;
- prime agricultural areas;
- gravel deposits;
- established future recreational areas;
- streams;
- steep slopes;
- established or committed parks.

Wherever possible, given all the other criteria that must be applied, transmission lines should follow the shortest routes, the straightest routes, and existing access.

4.4 Alignments

As illustrated in the maps, a number of penetrator corridor locations were identified at the inquiry. Location of corridors in the areas suggested was based mainly on the constraints and the availability of land, except in the southeast where the need for a specific (probably 500-kV) transmission line was foreseen.

The evidence and views of most of the participants seemed to highlight two geographic areas where future routes and dedicated corridors would be required. In the Board's view, the most likely location for a route or routes is from the area of the Ellerslie substation east to about where the RDA turns north on the eastern side of Edmonton, with the routes running either east or south. An extension of the RDA south that would avoid the major constraint areas and pass to the east of the Town of Beaumont appeared to be a possible alignment.

The only other potential need that was identified was in the northwest, and even then there was some doubt as to whether this would be needed if transmission by-passed the city and interconnections were made at Deerland substation. The least contentious of the routes proposed appeared to be an alignment south of Big Lake and probably south of Highway 16. An alternative to this would be a penetrator route to the east of St. Albert, although the constraints appeared more significant in this area.

Having recognized two areas where routes are expected to be needed in the future, the Board then considered the question of establishing a multi-facility or perhaps even a multi-use corridor. It appears to the Board that at this time it is not possible to specify in any detail the electric transmission requirements in even the most likely area, that is the area to the southeast. However, this does not prevent identifying a general alignment which could be used for either one or two transmission lines, for multiple facilities, or even for a multi-use corridor. The Board is of the opinion that such alignments should be identified in the southeast and in the northwest.

Should the need to set aside land for uses other than transmission lines cause penetrator corridors to be established in the southeast and northwest within the next few years, then the Board would recommend that provision be made for inclusion of transmission lines in such corridors.

Until such time as a multi-facility corridor is established, the Board sees no reason why single transmission line alignments should not be considered provided that the constraints identified at the inquiry are considered in establishing the alignment.

4.5 Implementation

Participants at the inquiry identified a number of possible methods of establishing routes or corridors by setting aside land prior to specific needs being established. The Board believes that the spectrum of possibilities is covered by the following examples:

- Taking no action at all until a specific proposal has been prepared and an alignment clearly identified.
- Establish some feature of the planning process which would provide a warning to planners and developers of a future need for a specific alignment.
- Alternatively, provide some feature of the planning process which would establish the future zoning and use of land along a particular alignment.
- A utility that expected at some time in the future to use a particular alignment for transmission lines would buy the land or obtain easement ahead of the actual need.
- The various municipalities involved could protect certain alignments through their approval process for developments.
- Land for the alignment of transmission lines could be acquired along with the acquisition of land for future transportation systems.
- The provincial government could pass legislation to create a special planning area and perhaps a special corridor authority, either or both of which would establish alignment for future transmission lines.
- There could be an extension of the existing RDA in the form of penetrator corridors as required.
- The provincial government could purchase rights of way for future transmission lines with sell-back provisions whereby the utilities would compensate the government for the cost of holding the land until needed.

Although the Board does not believe that the exact alignment of a future transmission line corridor can be established in either the southeast or northwest area at this time, it does believe that an alignment will be needed and should be brought to the attention of planners and developers and the public now. For this reason, the Board believes that area plans being developed should include a description of the probable alignment and future need for such transmission line corridors in the southeast and northwest areas.

Any such alignment must recognize the criteria and constraints identified at the inquiry and discussed in this report. The Board presents its interpretation of the result in the map entitled Future Areas For Transmission Line Corridors.

5 FINDINGS

Neither the precise need for, nor the exact location of, future electric transmission lines can be identified at this time. However, within two to five years the need should be more definite.

There is a probable need for future transmission lines in the northwest area and an almost certain need for future transmission lines in the southeast. For the southeast area, penetrator corridors will likely be needed both east and south from the present southeast corner of the RDA.

Notwithstanding that corridors for transmission lines will almost certainly be needed in the southeast, and probably in the northwest, multi-purpose corridors cannot be justified at this time on the basis of future electric transmission lines alone.

Should multi-purpose corridors be established in the northwest or southeast for other reasons and uses, particularly development of the transportation system, provision should be made for inclusion of transmission lines similar to the provisions for rights of way within the existing RDA.

Those planning other land uses in the northwest or southeast areas should be made aware of the expected need for future transmission lines in the vicinity.

Planning agencies appear to be in the best position to alert potential land developers to the need for future electric transmission lines in the geographical areas outlined in this report. The Board recommends that potential developers be alerted and, wherever possible, a suitable warning be added to area plans as they are developed and documented.

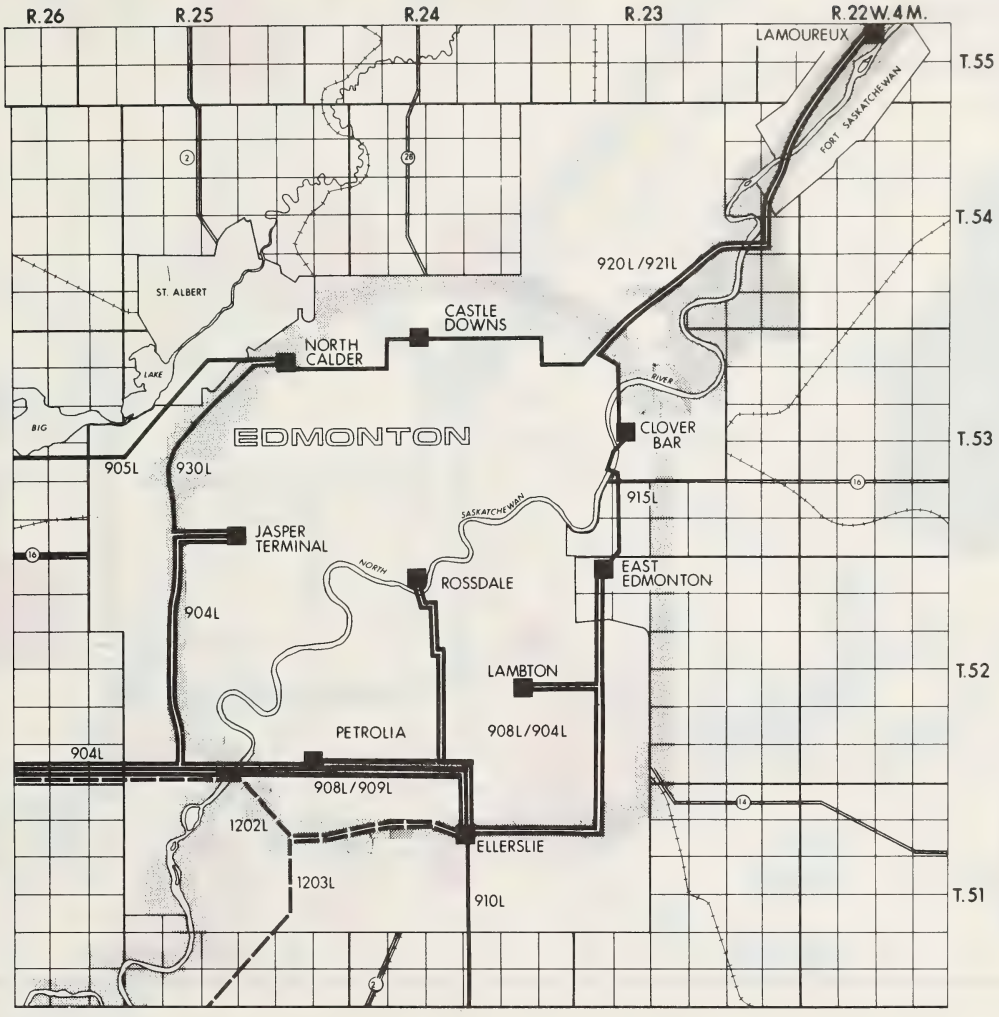
The Board concludes that electric utilities and planning agencies should continue to discuss development plans for land use and for future electric transmission lines around Edmonton with a view to firming up transmission planning within a few years. Board staff are available to assist in this process.

DATED at Calgary, Alberta on 22 February 1984

V. Millard
Chairman

V. E. Bohme
Board Member

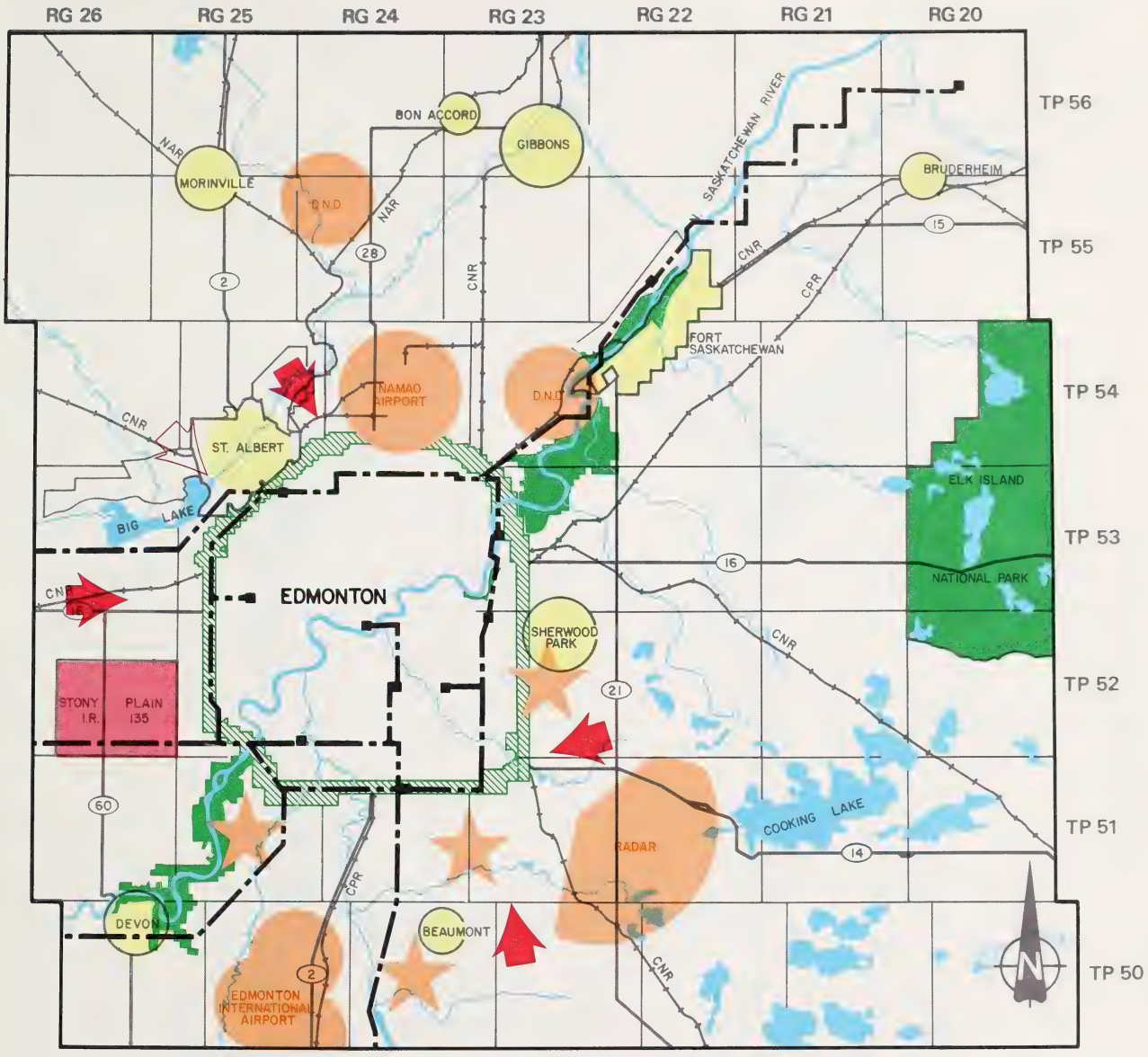
C. J. Goodman
Board Member



EDMONTON AREA

MAJOR ELECTRIC TRANSMISSION LINES

FIGURE 1



LEGEND

- EXISTING 240kV AND 500kV TRANSMISSION LINES
- EXISTING SUBSTATION SITES
- TRANSPORTATION & UTILITY CORRIDOR
- RESTRICTED DEVELOPMENT AREA AND NATIONAL PARK
- MAJOR CONSTRAINT AREAS
- RADIO STATION CONSTRAINT
- POTENTIAL CORRIDOR

SOURCE EUPC (FEBRUARY 1983)

EDMONTON AREA
MAJOR TRANSMISSION LINE CONSTRAINTS

FIGURE 2

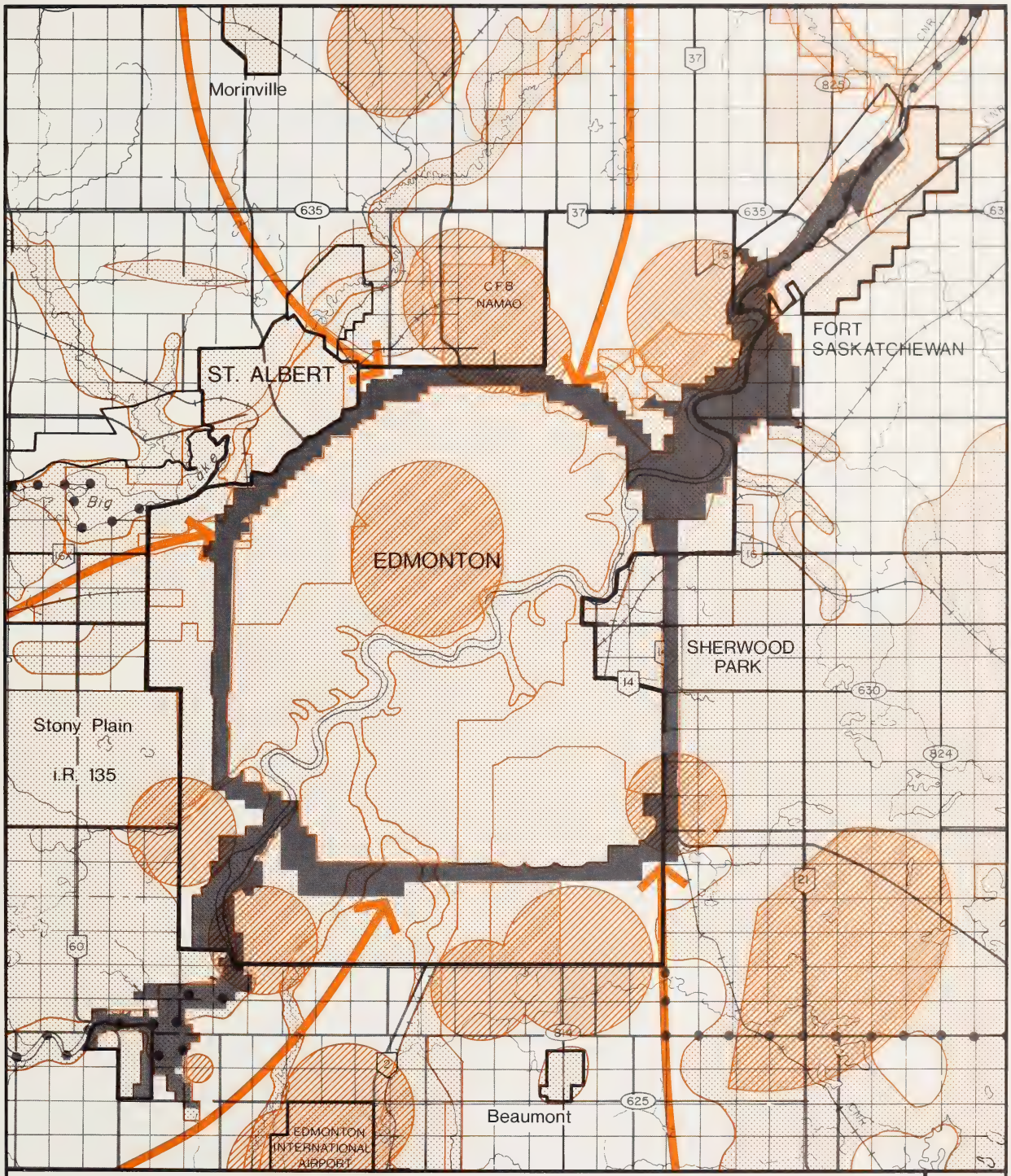


FIGURE 3

SOURCE: EMRPC (MAY 1983)

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APPENDIX I

THOSE WHO APPEARED AT THE HEARING

Principals and Representatives (Abbreviations Used in Report)	Witnesses
Electric Utility Planning Council (EUPC) E. O. McAvity	P. Roxburgh, P.Eng. J. Beckett, P.Eng.
Edmonton Metropolitan Regional Planning Commission (EMRPC) B. Fricson	R. N. Giffen, MCIP C. H. Weir B. Fricson
Stewart, Weir & Co. C. H. Weir	C. H. Weir J. Sherritt J. Raey
Transport Canada H. G. Gawne	H. G. Gawne E. Magurole
City of Edmonton M. Sherk	A. Sadesky, P.Eng. F. Kardel, P.Eng. L. Dale
City of St. Albert S. Weary	S. Weary
TransAlta Utilities Corporation (TransAlta) H. D. Williamson	M. D. Rogers, P.Eng. W. A. Hosie, P.Eng.
Alberta Government Telephones (AGT) H. Koumarelas	H. Koumarelas
Energy Resources Conservation Board staff K. F. Miller J. F. Wilson, P.Eng. M. MacRae J. W. Berg, P.Eng. D. Beamer, C.E.T.	